## **CC5** Ionic Bonding

#### CC5a lonic bonds

| Step            | Learning outcome   | Had a look | Nearly there | Nailed it! |
|-----------------|--|------------|--------------|------------|
| 6 <sup>th</sup> | Recall the formulae of simple ions.  |            |              |            |
| 8 <sup>th</sup> | Explain how cations and anions are formed.                                   |            |              |            |
| 80              | Use dot and cross diagrams to explain how ionic bonds are formed.            |            |              |            |
| 8**             | Explain the difference between an atom and an ion.                           |            |              |            |
| 9th             | Calculate the numbers of protons, neutrons and electrons in simple ions.     |            |              |            |
| 9 <sup>th</sup> | Explain the formation of ions in groups 1, 2, 6 and 7 of the periodic table. |            |              |            |

### **CC5b Ionic lattices**

| Step            | Learning outcome   | Had a look | Nearly there | Nailed it! |
|-----------------|--|------------|--------------|------------|
| 6 <sup>th</sup> | Recall the formulae of common polyatomic ions, and the charges on them.  |            |              |            |
| 7 <sup>th</sup> | Interpret the use of –ide and –ate endings in the names of compounds.    |            |              |            |
| 7 <sup>th</sup> | Name ionic compounds using –ide and –ate endings.                        |            |              |            |
| 81              | Work out the formula of an ionic compound from the formulae of its ions. |            |              |            |
| 8 <sup>th</sup> | Describe the structure of ionic compounds.                               |            |              |            |
| 8 <sup>th</sup> | Explain how ionic compounds are held together.                           |            |              |            |

### **CC5c Properties of ionic compounds**

| Step            | Learning outcome  | Had a look | Nearly there | Nailed it! |
|-----------------|---|------------|--------------|------------|
| 5 <sup>th</sup> | Describe the properties of ionic compounds.   |            |              |            |
| 7 <sup>th</sup> | Explain why ionic compounds have high melting points and high boiling points.                 |            |              |            |
| 7 <sup>th</sup> | Explain why ionic compounds conduct electricity when they are molten and in aqueous solution. |            |              |            |
| 7 <sup>th</sup> | Explain why ionic compounds do not conduct electricity as solids.                             |            |              |            |
| 7 <sup>th</sup> | Identify ionic compounds from data about their properties.                                    |            |              |            |

# CC6 Covalent bonding

## CC6a Covalent bonds

| Step            | Learning outcome  | Had a look | Nearly there | Nailed it! |
|-----------------|---|------------|--------------|------------|
| 7 <sup>th</sup> | Explain how covalent bonds are formed.  |            |              |            |
| 5 <sup>th</sup> | Recall the names of some common molecular elements.                           |            |              |            |
| 5 <sup>th</sup> | Recall the names of some common molecular compounds.                          |            |              |            |
| 6th             | State the bonding that is found in molecules.                                 |            |              |            |
| 6 <sup>th</sup> | State the approximate size (order or magnitude) of atoms and small molecules. |            |              |            |
| 8 <sup>th</sup> | Explain the formation of covalent bonds using dot and cross diagrams.         |            |              |            |

## CC7 Types of Substance

### CC7a Molecular compounds

| Step            | Learning outcome  | Had a look | Nearly there | Nailed it! |
|-----------------|---|------------|--------------|------------|
| 5 <sup>th</sup> | Recall examples of common covalent, simple molecular compounds.                             |            |              |            |
| 6 <sup>th</sup> | Describe the general properties of covalent, simple molecular compounds.                    |            |              |            |
| 80              | Explain why covalent, simple molecular<br>compounds have low melting and boiling<br>points. |            |              |            |
| 9th             | Explain why covalent, simple molecular compounds are poor conductors of electricity.        |            |              |            |
| 7 <sup>th</sup> | Describe the structure of a polymer.  |            |              |            |

### CC7b Allotropes of carbon

| Step            | Learning outcome   | Had a look | Nearly there | Nailed it! |
|-----------------|--|------------|--------------|------------|
| 5**             | Recall some allotropes of carbon.  |            |              |            |
| 70              | Describe the basic differences between covalent, simple molecules and giant covalent structures. |            |              |            |
| 7 <sup>th</sup> | Describe the structures of diamond, graphite, fullerenes and graphene.                           |            |              |            |
| 6 <sup>th</sup> | Describe the properties of diamond, graphite, fullerenes and graphene.                           |            |              |            |
| 200             | Explain the properties and uses of diamond and graphite in terms of their structure and bonding. |            |              |            |
| 9th             | Explain the properties of fullerenes and graphene in terms of their structure and bonding.       |            |              |            |

### **CC7c Properties of metals**

| Step            | Learning outcome  | Had a look | Nearly there | Nailed it! |
|-----------------|---|------------|--------------|------------|
| 6 <sup>th</sup> | Describe the particles and how they are arranged in metals. |            |              |            |
| 7 <sup>th</sup> | Explain why metals are malleable.                           |            |              |            |
| 7 <sup>th</sup> | Explain why metals conduct electricity.                     |            |              |            |
| 3rd             | Describe the typical properties of metals.                  |            |              |            |
| 3rd             | Describe the typical properties of non-metals.              |            |              |            |

Sciences

### **CC7d Bonding metals**

| Step            | Learning outcome   | Had a look | Nearly there | Nailed it! |
|-----------------|--|------------|--------------|------------|
| 6 th            | Give examples of ionic; covalent, simple molecular; covalent, giant molecular; and metallic substances.  |            |              |            |
| 7 <sup>th</sup> | Describe how the different types of bonds and structures are formed.   |            |              |            |
| 8.              | Explain how the structure and bonding of a substance is linked to its physical properties. (Relative melting point and boiling point, relative solubility in water and ability to conduct electricity, as solids and in solution.) |            |              |            |
| 8th             | Explain why we use models to represent structure and bonding.  |            |              |            |
| 81              | Represent structures and bonding using a variety of different models (dot and cross, ball and stick, 2D, 3D).  |            |              |            |
| 9 <sup>th</sup> | Describe the limitations of the different models<br>used to represent structure and bonding (dot<br>and cross, ball and stick, 2D, 3D).  |            |              |            |